

4.0 AFFECTED ENVIRONMENT

The following subsections describe the general Hanford Site environment, as well as the specific site environments for the locations of the Proposed and Alternative Actions. Supplementary detail regarding the habitat and environs of the Hanford Site can be found in the *Hanford Site 2001 Environmental Report* (PNNL 2002a) and *Hanford Site National Environmental Policy Act (NEPA) Characterization* (PNNL 2002b).

4.1 GENERAL HANFORD SITE ENVIRONMENT

The Hanford Site lies within the Pasco Basin of the Columbia Plateau in southeastern Washington State. The site occupies an area of approximately 1,517 km² (~586 mi²) located north of the city of Richland and the confluence of the Yakima and Columbia Rivers (DOE 1999). This large area has restricted public access and provides a buffer for the smaller areas on the Hanford Site that historically were used for production of nuclear materials, waste storage, and waste disposal. The Columbia River flows eastward through the northern part of the Hanford Site, then turns south, forming the eastern site boundary (PNNL 2002b).

The Hanford Site has a semiarid climate with 15 to 18 cm (6 to 7 in.) of annual precipitation, most of which takes place during the winter months. Average daily maximum temperatures range from 2°C (35°F) in late December and early January to 36°C (96°F) in late July. Monthly average wind speeds are lowest during the winter months, averaging 10 to 11 km/h (6 to 7 mph), and highest during the summer, averaging 13 to 14 km/h (8 to 9 mph) (PNNL 2002b), with infrequent periods of high winds of up to 128 km/h (80 mph). Tornadoes are extremely rare; no destructive tornadoes have occurred in the region surrounding the Hanford Site. The probability of a tornado hitting any given location on the Hanford Site is estimated at 1 chance in 100,000 during any given year. The region is categorized as one of low to moderate seismicity.

The vegetation on the Hanford Site is a shrub-steppe community of sagebrush and rabbitbrush with an understory consisting primarily of cheatgrass and Sandberg's bluegrass. As discussed in PNNL (2002b), natural plant communities have been altered by Euro-American activities that have resulted in the proliferation of nonnative species. Of the 590 species of vascular plants recorded for the Hanford Site, approximately 20% of all species are considered nonnative. The biodiversity inventories conducted by The Nature Conservancy of Washington between 1994 and 1999 (TNC 1999) identified 85 additional taxa, establishing the actual number of plant taxa on the Hanford Site at 675. Cheatgrass is the dominant nonnative species.

Several species of both plants and animals are under consideration for formal listing by the federal government and Washington State. Details are provided in PNNL (2002b) and are incorporated by reference in this EA. Relatively undisturbed areas of the mature shrub-steppe vegetation are high-quality habitat for many plants and animals and have been designated as "priority habitat" by Washington State.

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Most mammals known to inhabit the Hanford Site are small, nocturnal species, such as pocket mice and jackrabbits. Large mammals found on the Hanford Site are deer and elk, although the elk exist almost entirely on the Fitzner-Eberhardt Arid Lands Ecology Reserve. Coyotes and raptors are the primary predators. Several species of small birds nest in the steppe vegetation. Semiannual peaks in avian variety and abundance occur during migration seasons.

Threatened and endangered plants and animals identified on the Hanford Site, as listed by the federal government (16 U.S.C. 1531 and Title 50 *Code of Federal Regulations* Part 402) and Washington State (*Washington Administrative Code* [WAC] 232-012-297 and Washington Natural Heritage Program 1997), generally are not found in the vicinity of the borrow sites. No plants or mammals on the federal list of threatened and endangered wildlife and plants are known to be on the Hanford Site. There are, however, two species of birds (Aleutian Canada goose and bald eagle) on the federal list of threatened and endangered species that have been observed on the Hanford Site. Additional details regarding the protection and enhancement of bald eagle habitat on the Hanford Site are provided in the *Bald Eagle Site Management Plan for the Hanford Site, South-Central Washington* (DOE-RL 1994).

The Columbia River provides valuable habitat for aquatic organisms, and the Hanford Reach represents the only remaining significant spawning habitat for stocks of upriver bright fall chinook salmon and white sturgeon. The Upper Columbia River spring run chinook salmon, Middle Columbia River steelhead, and Upper Columbia River steelhead have been placed under the protection of the *Endangered Species Act of 1973*. These fish spawn in, or migrate through, the Hanford Reach. Additional details regarding the protection and enhancement of stocks of spring chinook salmon and steelhead within the Hanford Reach of the Columbia River are found in the *Threatened and Endangered Species Management Plan: Salmon and Steelhead* (DOE-RL 2000b).

4.2 SPECIFIC SITE ENVIRONMENT

Site-specific ecological resource reviews, cultural reconnaissance surveys, and literature searches were conducted for each of the Proposed Action areas. Results of these surveys are detailed in the following subsections and in Appendix B, “Ecological and Cultural Resource Reviews for Proposed Borrow Site Locations.” None of the alternatives presented would be located within a 100-year floodplain or wetland.

4.2.1 100-F Area Proposed Action Location

The proposed 100-F borrow area is within the perimeter of the 100-F Reactor Area (Figure 3-1 and Appendix A, Figure A-2). This area is a “Pre-existing, Nonconforming” land-use as described in the HCP EIS (DOE 1999). A portion of the proposed borrow site in the 100-F Area is located within 0.4 km (0.25 mi) of the Columbia River, in the area designated as the Hanford Reach National Monument. This site was surveyed for impacts to ecological and cultural resources, and the survey results were documented in Ecological Resource Reviews 00-ER-014 (BHI 2000b) and 02-ER-029 (BHI 2002b, Appendix B). The results of the ecological survey did not find any plant or animal species of concern in the area. That field investigation found that

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the eastern portion of the proposed borrow area has been used in the past as a source for borrow material and is highly disturbed. The vegetation in the previously mined area consists of a very sparse stand of small-stature gray rabbitbrush and a variety of understory species. The estimated ground area covered with vegetation in this exposed cobble area is less than 5%. To the west of this area, the soils have been previously disturbed, and the vegetative community is dominated by cheatgrass and sparse Sandberg's bluegrass with only a few rabbitbrush (BHI 2000b). No cultural resources were observed during the survey. The depth from the design excavation floor of the proposed action location to the groundwater interface is 3.3 m (10.7 ft).

4.2.2 100-H Area Proposed Action Location

The proposed 100-H borrow area is within the perimeter of the 100-H Reactor Area. It is adjacent to a previously used borrow area and is currently being used as a container queue for the 100-H Reactor ISS project (Figure 3-1 and Appendix A, Figure A-3). No vegetation is present on this site, and no plant or animal species of concern have been identified. The surface of the site is covered with a layer of compacted gravel over the native soil (BHI 2002b). No cultural resources were observed during the survey or have been previously documented (BHI 2002c, Appendix B). The depth from the design excavation floor of the proposed action location to the groundwater interface is 8.1 m (26.7 ft).

4.2.3 100-N Area Proposed Action Location

The proposed 100-N borrow area is adjacent to and south of the Hanford Generating Plant. The site was previously used as a borrow area during construction at the 100-N Area during the 1960s (Figure 3-1 and Appendix A, Figure A-4). The site includes a spoil pile that was left during construction that would be removed to grade and used for fill material. The spoil pile area of the proposed borrow site is located within 0.4 km (0.25 mi) of the Columbia River in the area designated as the Hanford Reach National Monument. The vegetation in the previously used borrow area and the surrounding area is dominated by cheatgrass and Sandberg's bluegrass. The vegetation in the previously mined area consists of a very sparse stand of small-stature gray rabbitbrush. No plant or animal species of concern were identified in the proposed borrow area (BHI 2002b). One traditional cultural site, *Mooli Mooli*, is located northeast of the project area. This area consists of rounded mounds of river-deposited sand and cobble of spiritual significance to Native American Tribes. Electrical transmission towers and a series of interconnecting railroad tracks isolate this cultural resource from the project area. The depth from the design excavation floor of the proposed action location to the groundwater interface is 12.0 m (39.4 ft).

4.2.4 Alternative Action Locations

The active borrow areas being considered for Alternative Actions under this EA include Pits 18, 19, 20, 21, and 23. Site conditions and natural resources associated with these areas are described below.

Pit 18 is located along F Avenue and Route 2 North (Figure 3-1). This pit has been used intermittently over the past several years for small quantities of backfill material. Previous resource reviews for this pit include 00-ER-001, 98-ER-010, and 97-ER-027 (BHI 2000a, 1998,

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and 1997a, respectively). Field surveys have documented that the active portions of Pit 18 are not vegetated, while the inactive area has naturally revegetated with native species. The area surrounding Pit 18 is high-quality habitat dominated by mature rabbitbrush with minor amounts of sagebrush, and disturbance or destruction of such a resource would require mitigation and restoration (DOE-RL 2001c).

Pits 19 and 20 are located along the Columbia River shoreline between the 100-H and 100-F Areas (Figure 3-1), within the bald eagle roost/nest restricted use area (Appendix A, Figure A-1) as identified in the *Bald Eagle Site Management Plan* (DOE-RL 1994). A pair of bald eagles has occupied a nest within 300 m of this location during each of the last 5 years. The 800-m buffer area surrounding the nest is restricted as long as the eagles are present, which would make these pits unavailable for use during that time. In 1999, nesting activities lasted from November through July. Habitat associated with Pits 19 and 20 consists mainly of cheatgrass, Sandberg's bluegrass, and a few rabbitbrush. Pits 19 and 20 have been recommended for closure in the *Draft Industrial Mineral Resources Management Plan* (DOE-RL 2000a) based on proximity to culturally sensitive areas and the known eagle roost/nest area.

Pit 21 is located south of the 100-D Area and adjacent to Route 2 North (Figure 3-1). Several ecological and cultural resource reviews were performed at the site between 1996 and 2002 (i.e., 96-ER-023, 97-ER-40, 99-ER-023, 99-ER-044, 00-ER-006, 00-ER-006a, 02-ER-027, and 02-ER-029 [BHI 1996, 1997b, 1999a, 1999b, 2000c, 2001a, 2002a, and 2002b, respectively]). The active portion of the borrow area is nonvegetated. The southern portion of the pit is inactive and has been revegetated with native species. Vegetation near the borrow area includes cheatgrass, Sandberg's bluegrass, globemallow, and tumbled mustard, with some incidence of sagebrush and rabbitbrush shrubs nearby. No plant or animal species of concern have been associated with Pit 21. No cultural resources have been documented in the area surrounding Pit 21.

Pit 23 is located at the southeast corner of the intersection of Route 1 and Route 4 North (Figure 3-1). The site has been used intermittently for backfill material over the past several years. The north and west boundaries of the pit are limited by Route 1 and Route 4 North, respectively. The south and west boundaries contain mature shrubs including sagebrush. Several ecological and cultural resource reviews were performed at the site between 1998 and 2000 (i.e., 98-ER-010, 00-ER-001, 00-ER-001a, 00-ER-001b [BHI 1998, 2000a, 2000d, and 2001b, respectively]). The active portion of the borrow area is nonvegetated. Vegetation surrounding the borrow area includes cheatgrass and Sandberg's bluegrass, with some incidence of sagebrush and rabbitbrush shrubs. No plant or animal species of concern have been associated with Pit 23. No cultural resources have been documented in the area surrounding Pit 23.

Other alternative borrow sites listed in Section 3.2.3 are located in the 200 and 300 Areas of the Hanford Site. Pits 30 and 31 are located adjacent to Route 1 in the 200 Area. Pits 32 and 33 are located in the 200 East Area, east of Route 4 North. Pits 34 and 35 are located in the 200 West Area, south of Route 1. Pits 6 and 9 are located in the 300 Area. Piper's daisy (*Erigeron piperianus*) (Washington State Sensitive Species) has been identified in Pits 30, 32, 33, and 35. Small evening-primrose (*Camissonia minor*) (Washington State Review Species) has been

identified in Pit 31, and the potential habitat for dwarf evening primrose (*Camissonia pygmaea*) (Washington State Threatened Species) and gray cryptantha (*Cryptantha leucophaea*) (Washington State Sensitive Species, Federal Species of Concern) has been identified in Pit 9. No species of concern have been observed in Pits 6 and 34.

4.3 SOCIOECONOMIC ENVIRONMENT

The cities of Kennewick, Pasco, and Richland (Tri-Cities) constitute the nearest population centers and are located southeast of the Hanford Site. The 1999 estimated population distribution is as follows: Kennewick, 50,950; Pasco, 26,600; and Richland, 36,880 (DOE 2001). The DOE, Richland Operations Office and its contractors dominate the local employment picture with almost one-quarter of the total nonagricultural jobs in Benton and Franklin Counties. Ninety-three percent of Hanford Site personnel reside in the Benton and Franklin County areas. Therefore, work activities on the Hanford Site play an important role in the socioeconomics of the Tri-Cities and other parts of Benton and Franklin Counties (PNNL 2002b). Other counties are less affected by changes in Hanford Site employment.

